

CLAIMS

1. A homopolar machine comprising:
a shaft;
an armature coupled to the shaft and mounted so as to rotate with said
5 shaft;
at least two stators that encircle the armature,
a negative bus connected to a first stator,
a positive bus connected to a second stator,
a first negative brush carried by said first stator for contact with said
10 armature at one location; and
a second negative brush carried by said armature for contact with said
second stator.
2. The homopolar machine in accordance with claim 1, wherein each
said brush is part of an assembly that includes an actuator and a holder designed to
15 effect said contact.
3. The homopolar machine in accordance with claim 2, wherein said
holder includes a crosspiece that carries a plurality of brushes and which crosspiece
slides between a pair of flat plates.
4. The homopolar machine in accordance with claim 1, wherein each of
20 said brushes comprises flexible, solid, electrically conductive material.
5. The homopolar machine in accordance with claim 1, wherein each of
said brushes comprises electrically conductive fibers made from copper or a copper
alloy.
6. The homopolar machine in accordance with claim 1, wherein each of
25 said brushes comprises electrically conductive foils of copper or a copper alloy.
7. The homopolar machine in accordance with claim 1 wherein said
second negative brush is fixedly attached to said armature and means is included for
moving said second stator into contact therewith.

8. The homopolar machine in accordance with claim 1 which is configured to operate as a motor.

9. The homopolar machine in accordance with claim 1 which is configured to operate as a generator.

5 10. A homopolar machine comprising:
 a shaft;
 an armature assembly coupled to the shaft that includes a cylinder
 having a pair of spaced apart generally radially extending flanges,
 first and second stators arrays that encircle the armature assembly;
10 a negative bus connected to a first stator of said array,
 a positive bus connected to a second stator of said array ,
 a first negative brush carried by said first stator for contact with said
 armature at one flange; and
 a second negative brush carried by the other flange of said armature for
15 contact with said second stator.

11. The homopolar machine in accordance with claim 10 wherein each said brush is part of an assembly that includes an actuator and a holder designed to effect said contact.

20 12. The homopolar machine in accordance claim 11 wherein said holder
 includes a component mounted in fixed relation to said first stator and a second
 slidable component which carries said first negative brush.

13. The homopolar machine in accordance with claim 12 wherein said second slidable component carries a plurality of brushes and is slidable between a pair of parallel flat plates that form a part of said first component.

25 14. The homopolar machine in accordance with claim 13 wherein said
 fixed component includes a radially aligned stem formed with a pair of opposed
 parallel surfaces that are perpendicular to said flat plates and wherein said slidable
 component include a pair of flexible heads that engage said opposed surfaces.

15. The homopolar machine in accordance with claim 14 wherein said

flexible heads include a stack of generally parallel ribbons cut by EDM from conductive metal.

16. The homopolar machine in accordance with claim 15 wherein said heads are mounted so that said ribbons are flexed against said opposed surfaces.

5 17. The homopolar machine in accordance with claim 10 wherein said second negative brush is fixedly attached to said other flange of said armature and means is included for moving said second stator into contact therewith.

10 18. A method of operating a homopolar motor, which includes a field coil, a shaft, an armature coupled to the shaft and mounted so as to rotate with said shaft, at least two stators that encircle the armature, a negative bus connected to a first stator, and a positive bus connected to a second stator, which method comprises
energizing the field coil in the homopolar motor; and
supplying current to said armature from said stators through brushes,
all of which brushes are negatively polarized.

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